

WHAT IS CLAIMED IS:

1. A method for non-destructive testing of a structure, the method comprising the steps of:  
  
depositing energy within at least a portion of a volume of a structure; and  
  
detecting transient temperatures at a surface of the structure caused by diffusion of the deposited energy.
2. The method for non-destructive testing according to Claim 1, further including the step of automatically analyzing the detected transient temperatures.
3. The method for non-destructive testing according to Claim 2, further including the step of automatically analyzing the detected transient temperatures by a computer processor.
4. The method for non-destructive testing according to Claim 2, further including the step of determining whether a flaw is present in the structure.
5. The method for non-destructive testing according to Claim 4, further including the step of recording a location of one or more detected flaws in a structure.
6. The method for non-destructive testing according to Claim 5, further including the step of providing a user with at least one of an auditory or visual indication when a flaw is detected.
7. The method for non-destructive testing according to Claim 1, wherein the transient temperatures are detected by one or more IR focal plane arrays.

8. The method for non-destructive testing according to Claim 7, wherein the IR focal plane array is an IR camera.

9. The method for non-destructive testing according to Claim 8, wherein the IR camera is an IR video camera.

10. The method for non-destructive testing according to Claim 1, wherein the deposited energy is at least one of dielectric heating, induction heating or penetration radiation.

11. The method for non-destructive testing according to Claim 10, wherein the penetration radiation is at least one of gamma rays or x-rays.

12. The method for non-destructive testing according to Claim 1, further including the step of varying frequency of the deposited energy to produce a resonating effect within the structure.

13. The method for non-destructive testing according to Claim 1, wherein the energy deposited includes multiple energy frequencies.

14. The method for non-destructive testing according to Claim 1, wherein the structure is at least one of a metal, composite metal, carbon fiber, ceramics or fiberglass.

15. The method for non-destructive testing according to Claim 1, wherein the structure is comprised of a metallic portion and a non-metallic portion.

16. The method for non-destructive testing according to Claim 1, wherein the structure is comprised of at least two thermally dissimilar metals.

17. The method for non-destructive testing according to Claim 15, wherein the structure is comprised of a metal, a boron-epoxy skin and a honeycomb panel.

18. The method for non-destructive testing according to Claim 1, wherein the diffusion of the deposited energy forms a pattern.

19. The method for non-destructive testing according to Claim 18, wherein the pattern has a honeycomb shape.

20. The method for non-destructive testing according to Claim 19, wherein the structure is and airplane wing.

21. The method for non-destructive testing according to Claim 20, wherein the airplane wing is an F-15 airplane wing.

22. An apparatus for non-destructive testing of an object, the apparatus comprising:
- An induction coil capable of injecting energy volumetrically into at least a portion of an object;
- an IR camera for viewing transient heat generated by the energy introduced into the object by the induction coil as the heat exits a surface of the object.
23. The apparatus for non-destructive testing according to Claim 22, wherein the apparatus is portable.
24. The apparatus for non-destructive testing according to Claim 22, wherein the apparatus can be mounted on a users head.
25. The method for non-destructive testing according to Claim 22, wherein the deposited energy is at least one of dielectric heating, induction heating or penetrating radiation.
26. The method for non-destructive testing according to Claim 25, wherein the penetrating radiation is at least one of gamma rays or x-rays.
27. The method for non-destructive testing according to Claim 22, wherein frequency of the deposited energy to produce a resonating effect within the object can be varied.
28. The method for non-destructive testing according to Claim 22, wherein the energy deposited is a direct current and is applied to at least a portion of the surface of the object.

29. A method for non-destructive testing of a structure, the method comprising the steps of:

applying a DC current to at least a portion of a volume of a structure; and

detecting transient temperatures at a surface of the structure caused by diffusion of the deposited energy.

30. A method for non-destructive testing of a structure, the method comprising the steps of:

means for injecting energy within at least a portion of a volume of a structure; and

means for monitoring temperatures at a surface of the structure caused by diffusion of the deposited energy.

31. The method for non-destructive testing according to Claim 30, further including means for analyzing the monitored temperatures.

32. The method for non-destructive testing according to Claim 31, further including means for analyzing the monitored temperatures by a computer processor.

33. The method for non-destructive testing according to Claim 30, further including means for determining whether a flaw is present in the structure.